List of Questions and Answers for LDAR Requirements

Leak Detection and Repair Requirements are found in 63.1331

When do I need to be in compliance?

The compliance date for the leak detection and repair program is June 19, 2001.

How do I identify components subject to this subpart?

Components do not need to be individually tagged, however they need to be identified in a manner that distinguishes it readily from components not subject to this subpart. An example of identification includes ID's on plant site plans and log entries. (63.162)

You do need to have a list of identification numbers for subject equipment. Connectors do not need to be individually identified if all connectors in a designated area or length of pipe subject are identified as a group and indicate the number of connectors subject. (63.181)

What do I need to do?

For all process units comply with the LDAR requirements in subpart H, however some of the requirements for affected PET sources have been modified.

The table below describes the monitoring frequency and required monitoring methods.

Component	Monitoring Frequency	Leak Definition	Method
Pumps in Light Liquid Service	Monthly	Phase I: 10,000 ppm Phase II: 5,000 ppm Phase III: 5,000 ppm when containing polymerizing material; 2,000 ppm if food/medical service; 1,000 all other pumps	Method 21
	Weekly	Indication of liquid dripping from pump seal	Visually

Component	Monitoring Frequency	Leak Definition	Method
Valves in gas/vapor service and light liquid service	During Phase I and II: quarterly During Phase III: >2% leak rate monthly or implement QIP <2% once per quarter <1% once every two quarters <0.5% once every four quarters If less than 250 valves in HAP service once every quarter.	Phase I: 10,000ppm Phase II: 500 ppm Phase III: 500 ppm	Method 21
Pumps, valves, connectors, and agitators in heavy liquid service	no schedule	>10,000 ppm for Agitators >5,000 ppm for pumps handling polymerizing material >2,000 ppm for pumps in food/medical service >1,000 ppm for all other pumps >500 ppm for valves, connectors, instrumentation systems and pressure relief devices.	If sign of visual, audible, olfactory leak, monitor using method 21 within 5 days.
Agitators in gas/vapor service and in light liquid service	monthly	>10,000 ppm	Method 21
	weekly	indication of liquids dripping	Visual

Component	Monitoring Frequency	Leak Definition	Method
Connectors in gas/vapor service and in light liquid service	annually if $0.5% leak rate once every two years if <0.5% leak rate if less than 0.5% after two year monitoring period go to a once every four year monitoring period If at four year monitoring period and find a leak rate $0.5% and < 1% monitor biannually. If at four year monitoring period and find a leak rate >1.0% monitor annually.	500 ppm	Method 21
Pressure Relief devices in gas/vapor service.	Monitor within 5 days of a pressure release.	Reading less than 500 ppm except during periods of venting.	Method 21

Are there any components that are exempted from or have reduced monitoring?

In each category there are components that do not need to be monitored. These are listed.

Component Type	Exemption/Reduction
All components in less than 300 hours (per calendar year) of HAP service,	Not subject to this subpart.
All components in vacuum service.	Not subject to this subpart.

Component Type	Exemption/Reduction
Pumps with a dual mechanical seal that include a barrier fluid system	Exempted from Method 21 monitoring provided: Each dual mechanical seal system: - Operated with the barrier fluid at a pressure greater than the pump stuffing box pressure; or - Equipped with a barrier fluid degassing reservoir that is routed to a process or fuel gas system or connected by a closed vent system to a control device that complies with the control requirements for closed vent systems; or - Equipped with a closed-loop system that purges the barrier fluid into a process stream 2) The barrier fluid is not in light liquid service 3) Each barrier fluid is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both. 4) Each pump is checked by visual inspection for indication of liquids dripping. If visual monitor within 5 days using method 21. 5) Each sensor is observed daily or equipped with an alarm
Pumps designed with no externally actuated shaft penetrating the pump housing.	Exempted from visual and Method 21 monitoring.
Pumps equipped with closed vent system capable of capturing and transporting any leakage from the seal(s) to a process or fuel gas system or to a control device that complies with the control requirements for closed vent systems.	Exempted from visual and Method 21 monitoring.
Pumps located within the boundary of an unmanned plant site	Exempted from weekly visual monitoring provided it is visually inspected as often as practicable and at least monthly.
90% of *pumps* in process unit meet the exemptions of dual mechanical seal and/or no external actuated shaft.	The process unit is exempt from the calculation of percent leaking pumps determination.

Component Type	Exemption/Reduction
Pumps designated as unsafe to monitor	Exempted from weekly visual and Method 21 if owner or operator determines that the pump is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying. In addition, the owner or operator has a written plan that requires monitoring as frequently as practical during safe to monitor times, but not more frequently than the periodic monitoring.
Pressure relief devices that are routed to a process or fuel gas system or equipped with a closed-vent system capable of capturing and transporting leakage from the pressure relief device to a control device that complies with the control requirements for closed vent systems	Exempted from 500 ppm limit and monitoring after pressure release.
Pressure relief devices that are equipped with a rupture disk upstream of the pressure relief device.	Exempted from 500 ppm limit and monitoring after pressure release as long as after each pressure release a rupture disk is installed upstream of the pressure relief device as soon as practicable but no later than 5 calendar days after each pressure release.
Valves designated as unsafe to monitor	Exempted from weekly visual and Method 21 if owner or operator determines that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying. In addition, the owner or operator has a written plan that requires monitoring as frequently as practical during safe to monitor times, but not more frequently than the periodic monitoring.
Valves at facilities that have less than 250 valves in organic HAP service	Exempted from the requirements for monthly monitoring and quality improvement program. Instead the facility has to monitor the valves on a quarterly basis or on a biquarterly basis if <1% leak rate.

Component Type	Exemption/Reduction
Agitators equipped with a dual mechanical seal system that includes a barrier fluid system	This seal should be operated with 1) The barrier fluid at a pressure greater than the compressor stuffing box pressure, **or** 2) Equipped with a degassing reservoir that is routed to a process or fuel gas system, or connected to a closed vent system to a control device that is in compliance with the closed vent system requirements, **or** 3) Equipped with a closed-loop system that purges the barrier fluid directly into a process stream The barrier fluid cannot be in light liquid service and should have a sensor that detects failure of the seal system, barrier fluid system, or both. The sensor should be observed daily or shall be equipped with an alarm, unless the compressor is located within the boundary of an unmanned plant site. Must be visually checked weekly for indications of liquids dripping from the agitator seal, and if liquid seen monitored using Method 21 to see if meets leak definition.
Agitators designed with no externally actuating shaft penetrating the agitator housing is exempt.	
Agitators located within the boundary of an unmanned plant site	Exempted from weekly visual inspection and daily inspections for dual mechanical seals. Must be visually inspected as often as practical and at least monthly.

Component Type	Exemption/Reduction
Difficult to monitor *Agitators*	Exempted if: 1) agitator cannot be monitored without elevating the inspector more than two meters above a support surface or it is not accessible at anytime in a safe manner. 2) the process unit within the agitator is located is an existing source or the owner or operator designates less than three percent of the total number of agitators in a new source as difficult to monitor, and 3) The owner or operator follows a written plan that requires monitoring at least once per calendar year.
Agitators obstructed by equipment or piping that prevents access to the agitator by a monitor probe.	Exempted from monitoring requirements.
Agitators designated as unsafe to monitor	Exempt if: 1) The owner or operator determines that the monitoring personnel would be exposed to an immediate danger as a consequence of complying 2) The owner or operator of the agitator has a written plan that requires monitoring of the agitator as frequently as practical during safe to monitor times, but not more frequently that the periodic monitoring schedule.
Connectors designated as unsafe to monitor	Exempted from Method 21 monitoring if owner or operator determines that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying. In addition, the owner or operator has a written plan that requires monitoring as frequently as practical during safe to monitor times, but not more frequently than the periodic monitoring.

<table>
<tr><th>Component Type</th><th>Exemption/Reduction</th></tr>
<tr><td>Connector that are inaccessible or is ceramic or ceramic lined, is exempt from the monitoring, recordkeeping, and reporting requirements.</td><td>Inaccessible means:

a) Buried
b) Insulated in a manner that prevents access to the connector by a monitor probe.
c) Obstructed by equipment or piping that prevents access to the connector by a monitoring probe.
d) Unable to be reached from a wheeled scissor-lift or hydraulic-type scaffold which would allow access to connectors up to 7.6 meters above the ground.
e) Inaccessible because it would require elevating the monitoring personnel more than 2 meters above a permanent support surface or would require the erection of scaffold, or
f) Not able to be accessed at any time in a safe manner to perform monitoring. Unsafe access includes, but is not limited to the use of a wheeled scissor lift on unstable or uneven terrain, the use of a motorized man lift basket in areas where an ignition potentially exists, or access would require near proximity to hazards such as electrical lines or would risk damage to equipment.</td></tr>
<tr><td>Batch processes can monitor on a reduced basis</td><td>Dependent on the % of operating time during the year, however annual monitoring remains annual
<table>
<tr><th>Op time %</th><th>Monthly</th><th>Quarterly</th><th>Semi-annually</th></tr>
<tr><td>0 to <25%</td><td>Quarterly</td><td>Annually</td><td>Annually</td></tr>
<tr><td>15 to <50%</td><td>Quarterly</td><td>Semiannuall y</td><td>Annually</td></tr>
<tr><td>50 to <75%</td><td>Bimonthly</td><td>Three times</td><td>Semi-annually</td></tr>
<tr><td>75 to 100%</td><td>Monthly</td><td>Quarterly</td><td>Semi-annually</td></tr>
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If I find a leak, what do I need to do?

A weatherproof and readily visible identification must be placed on the tag (leak tag), This must contain the equipment identification number. This tag on valves and connectors may be removed after followup monitoring has been conducted (valves: next monitoring period; connectors: three months after back in HAP service).

First attempts at repair need to be conducted within 5 calendar days from the date detected. The component needs to be repaired within 15 calendar days from the date detected.

Repaired means that the equipment:(63.161)

(1) Is adjusted, or otherwise altered, to eliminate a leak as defined by the leak definition. (However agitators considered leaking at 1,000 ppm are not required to be repaired until at 2,000 ppm).

(2) Unless otherwise specified in applicable provisions, is monitored using Method 21, to verify that emissions from the equipment are below the applicable leak definition.

Can I have Delays of Repair? (63.171)
Delays of repair for which leaks have been detected is allowed if the repair is not technically feasible without a process unit shutdown.

Delays of repair are allowed if equipment is isolated from the process and does not remain in organic HAP service.

Delays of repairs for valves, connectors, and agitators is also allowed if:

1) Emissions from immediate repair would be greater than the fugitive emissions likely to result from the delay of repair.

2) When repair procedures are effected, the purged material is collected and destroyed or recovered in a control device complying with the

closed vent system provisions.

Delays of repairs for pumps is allowed if:

1) Repair requires replacing the existing seal design with a new system that the owner has determined would provide better performance under 63.176(d) , or a dual mechanical seal system, or a pump with no actuating shaft penetrating the pump housing, or a closed vent system and controls device, and

2) Repair is completed as soon as practicable but not later than 6 months after the leak was detected.

Delay of repair beyond a process unit shut down is allowed for a valve if valve assembly replacement is necessary during the process unit shut down a, valve assembly supplies have been depleted, and valve assembly supplies had been sufficiently stocked before the supplies were depleted. Delay of repair beyond the second process unit shutdown will not be allowed unless the third process unit shut down occurs sooner than 6 months after the first process unit shut down.

What are my requirements for Compressors? (63.164)

Compressors should be equipped with a seal system that includes a barrier fluid system that prevents leakage of process fluid to the atmosphere.

This seal should be operated with

1) The barrier fluid at a pressure greater than the compressor stuffing box pressure, **or**
2) Equipped with a degassing reservoir that is routed to a process or fuel gas system, or connected to a closed vent system to a control device that is in compliance with the closed vent system requirements, **or**
3) Equipped with a closed-loop system that purges the barrier fluid directly into a process stream

The barrier fluid cannot be in light liquid service and should have a sensor that detects failure of the seal system, barrier fluid system, or both. The sensor should be observed daily or shall be equipped with an alarm, unless the compressor is located within the boundary of an unmanned plant site.

The owner shall determine what conditions (based on design) designate a failure of the seal system, barrier fluid system, or both. If the either fail, it should be considered a leak.

If a compressor has a designation to operate with an instrument reading less than 500ppm above background, it is exempt if it is demonstrated through the use of Method 21 and is tested initially upon designation, annually, and at other times as requested by Administrator.

What are my requirements for open ended valves or lines? (63.168)

Each open-ended valve or line should be equipped with a cap, blind flange, plug, or second valve. These should seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line, or during repairs.

If a second valve is used, it will be operated so that the first valve (on the process side) is closed before closing the second vavle.

If a double block and bleed system is used, the bleed valve or line may remain open during operation that require venting the line but must be closed all other times.

If you have an open ended valve or line that in an emergency shutdown system that are designed to open automatically in the event of a process upset, they are exempt from these requirements.

If you have an open ended valve or line that contains material which would autocatalytically polymerize, or would present an explosion, serious overpressure, or other safety hazard if capped or equipped with a double block and bleed system are exempted from these requirements.

What are my requirements for surge control vessels, and bottom receivers? (63.170)

If you have a vessel that is not routed back to process and meet the following size and vapor pressures in the below table, then you have to equip it with a closed vent system that routes the organic vapors back to the process or to a control device, or comply with requirements for storage vessels.

Existing sources:

Vessel Capacity (cubic meters)	Vapor Pressure (kilopascals) [at operating temperature]
75# capacity < 151	$ 13.1
151 # capacity	$ 5.2

New sources:

Vessel Capacity (cubic meters)	Vapor Pressure (kilopascals) [at operating temperature]
38# capacity < 151	$ 13.1
151 # capacity	$ 0.7

What are my control requirements for a Closed vent system and control devices? (63.172)

Recovery or recapture devices shall be designed and operated to recover the organic hazardous air pollutant emissions or VOC's with an efficiency of 95% or allow an exit concentration of 20 ppmv. (Whichever is less stringent)

Enclosed combustion devices shall be designed and operated to reduce the organic hazardous air pollutant emissions or VOCs by 95% or allow an exit concentration of 20ppmv, on a dry basis, corrected to 3% oxygen if supplemental combustion air is used, or minimum residence time of 0.5 seconds with a minimum temperature of 760

C.

Flares can be used, but must comply with the flare requirements found in 63.11(b).

What are my inspection requirements for Closed vent systems and control devices? (63.172)

Each closed vent system shall be inspected according to the following:

If constructed of hard-piping: conduct an initial inspection using Method 21. and annual visual inspections for visible, audible, or olfactory indication of leaks.

If vapor collection system or closed-vent system constructed of duct work: conduct an initial inspection using Method 21 and annual inspections using Method 21.

If inspecting personnel would be exposed to imminent or potential danger conducting these inspections, they are exempt provided the owner or operator has a written plan that requires inspection of the equipment as frequently as practicable during safe to inspect times, but not more frequently than annually.

If parts are designated as unsafe to monitor they are exempt from the requirements if the equipment cannot be inspected without elevating the inspecting personnel more than 2 meters above a supported surface, and has a written plan that requires inspection of the equipment at least once every 5 years.

What do I need to do if any leaks are found in my Closed vent system?

If any leaks are found (500ppm using Method 21 or visual inspection indications) leaks first attempt within 5 calendar days of discovery and repaired within 15 calendar days of discovery.

Delay of Repair is allowable if repair is technically infeasible without a process shutdown or owner or operator determines that emissions resulting from immediate repair would result in greater emissions than fugitive emissions from the delayed repair. These leaks should be repaired during the next process shut down.

What do I need to do for bypass lines in my Closed vent system?

If there are bypass lines that could divert a vent stream away from the control device and to the atmosphere comply with one of the following options:

1) Install, set or adjust, maintain, and operate a flow indicator that takes a reading at least once every 15 minutes. This indicator should be installed at the entrance to any bypass line. Records should be kept as indicated in the process based requirements (pleas see other section of tool).

2) Secure the bypass line valve in the non-diverting position with a car-seal or a lock and key type configuration. A visual inspection of the closure should be performed at least once every month to ensure the vent stream has not been diverted.

3) Low leg drains, high point bleeds, analyzer vents, open ended valves, or lines, and pressure relief valves needed for safety purposes are not subject to this requirement.

What are my recordkeeping requirements? (63.181)

List of identification numbers for all subject components, except connectors do not have be individually identified, they can be identified as a group.

Schedule of monitoring for valves (if under reduced monitoring) and connectors.

List of identification numbers for all components equipped under the closed vent system and control devices.

List of compressors designated as operating below 500ppm.

List of surge control vessels or bottoms receives subject that are equipped with closed vent and control device system.

List of all pressure relief valves, and pressure relief valves equipped with rupture disks.

List of all screwed connectors with broken seals

Following information for each dual mechanical seal system:

- Design criteria, and explanations of design criteria.
- Any changes to these criteria

List of all equipment designated as unsafe to monitor or difficult to monitor, and explanations of why they are designated as such.

List of unsafe to repair connectors and why it is designated as such.

If net credits are used for valves or connectors, lists of all removed.

List of connectors removed or added and documentation of integrity of welds of removed connectors.

For alternative reduced batch monitoring option:

- records documenting the operating time of the process unit.
- list of all new or added equipment

For required visual inspections: Document that the inspection occurred and the date of inspection.

For leaking components:

1) Instrument and equipment identification number and operator name, initials, or identification number.

2) The date the leak was detected and the date of first attempt to repair the leak.

3) The date of successful repair of the leak

4) Maximum instrument reading measured by Method 21 (as applicable) after successful or determining it is non-repairable.

5) Repair delayed and the reason for the delay. (Can be done through the development of a written procedure)

6) If delay of repair is due to depleted stock, documentation that adequately proves that spare parts were adequately stocked before depletion and reason for depletion.

7) Dates of process unit shutdowns that occur while the equipment is unrepaired.

8) Identification of connectors where seals have been broken since the last monitoring period. Dates and results of the monitoring after seal breaks.

9) Dates and results of monitoring for alternative batch monitoring for all equipment added since the last monitoring period. If no leaks record that monitoring was done and dates of monitoring.

10) Copies of all period reports if not maintained on a computerized database capable of generating summary reports from the records.

For alternative batch monitoring using pressure testing.

- **S** Identification of each product or product code produced during the calendar year.
- **S** Physical tagging of equipment is not required. Equipment may be identified on a plant site plan, in log sheets or by other appropriate

methods.

- Dates of each pressure test, the test pressure, and the observed pressure drop.
- Records of any visible audible or olfactory evidence.
- If unit doesn't pass two consecutive pressure tests keep the following for two years:
    - Date of each pressure test and the date of each leak repair attempt.
    - Repair methods applied in each attempt to repair the leak
    - the reasons for delay of repair.
    - the expected date for delivery of the replacement equipment and the actual date of delivery of the equipment.
    - the date of successful repair.
    -

For compressors below 500ppm and pressure relief valves after a release.

- Background measured during the test.
- The maximum instrument reading

For closed-vent systems and control device.

Retain for life: The design specifications and performance demonstrations.

- Detailed schematics, design specifications of the control device, and piping and instrumentation diagrams.
- The dates and descriptions of any changes to the design specification.
- The flare design and results of the compliance test.
- Description of the parameter or parameters monitored to ensure that control devices are

operated and maintained in conformance with their design and an explanation of why the parameter was selected.

Retain for two years: Records of operation of closed vent systems and control devices.

- **S** Dates and durations when closed-vent systems and control devices are not operated as designed as indicated by the monitored parameters, including periods when the flare pilot light system doesn't have aflame.
- **S** Dates and durations during which the monitoring system or monitoring device is inoperative.
- **S** Dates and durations of start-ups and shutdowns of control devices.
- **S** Records of inspections of closed vent systems.
  - **S** if no leak found, record that it was performed, the date, and a statement that no leak was found.
  - **S** if leak found the same records required for other leaking components.

Identification, either by list location (area or group) of equipment in less than 300 hours of operators.

What are my reporting requirements? (63.182)

Notification of Compliance status: within 90 days of the compliance date:

For each process unit contains:

1. Process unit identification.
2. Number of each equipment type (e.g. valves, pumps) excluding equipment in vacuum service.
3. Method of compliance with the standard (e.g. monthly LDAR, equipped with dual mechanical seal)
4. Planned schedule for each Phase
5. If choosing to monitor alternative for batch processes.
    a) Batch products or product codes subject to this subpart
    b) Planned schedule for pressure testing when equipment is configured from production of subject products.
6. If choosing to use enclosed vented process unit alternatives
    a) Process unit identification
    b) Description of system used to create the negative pressure.

Periodic Reports: every 6 months

1) Number of valves, pumps, compressors, agitators, connectors for which leaks were detected, percent leakers, and total number of valves, pumps, compressors, agitators, connectors monitored.
2) Number of valves, pumps, compressors, agitators, connectors for which leaks were not repaired and number determined non repairable
3) Facts that explain any delay of repair and were appropriate why a process unit shutdown was technically infeasible.
4) Results of all monitoring of dual mechanical seal systems conducted within the semiannual reporting period.
5) If applicable, state if quality improvement program implemented
6) If applicable, change in connector monitoring alternatives (broken seals)
7) If applicable, Part 264 subpart BB or Part 265 subpart BB information.
8) If applicable, alternative batch process vent testing results.
    a) Batch product process equipment train identification
    b) The number of pressure tests conducted
    c) The number of pressure tests where the equipment train failed.
    d) The facts that explain any delay of repair.

9) The results of all inspections of closed vent systems.

What about Quality Improvement Programs?

Please see the specific regulation for implementation, recordkeeping and reporting requirements for QIP programs.